CLAIMS

1. A process for depositing, on a substrate, a coating based on semiconductor materials based on metal oxides, especially titanium oxide, which are capable, under the effect of radiation of suitable wavelength, of initiating radical reactions causing the oxidation of organic substances so as to confer photocatalytic properties on said coating, characterized in that the coating with photocatalytic properties is deposited by chemical vapor deposition, especially from a gas mixture comprising at least one organometallic precursor and/or a metal halide of said metal oxide, the deposition being enhanced by a plasma source. 1'

2. The process as claimed in claim 1, characterized in that at least one carrier gas or a mixture of carrier gases, chosen from air, nitrogen, helium and argon, is injected parallel to the mixture containing the precursor.

3. The process as claimed in either of claims 1 and 2, characterized in that an oxidizing agent or a mixture of oxidizing agents is incorporated into the gas mixture.

4. The process as claimed in either of claims 1 and 2, characterized in that a reducing agent or a mixture of reducing agents is incorporated into the gas mixture.

5. The process as claimed in one of claims 1 to 4, characterized in that the reaction and deposition phase takes place at reduced pressure.

6. The process as claimed in claim 5, characterized in that the reaction and deposition phase takes place at atmospheric pressure.

7. The process as claimed in one of claims 1 to 6, characterized in that at least one sublayer is deposited, prior to the deposition of the coating with photocatalytic properties, making it possible to impart another functionality to said coating with photocatalytic properties and/or to reinforce said properties of said coating.

8. The process as claimed in one of claims 1 to 7, characterized in that incorporated into the gas mixture comprising at least the organometallic precursor and/or a metal halide of said metal oxide is at least one other type of mineral material, especially in the form of an amorphous or partially crystallized oxide, for example a silicon oxide (or mixture of oxides), titanium oxide, tin oxide, zirconium

oxide, aluminum oxide, vanadium oxide, antimony oxide, zinc oxide, nickel oxide or cobalt oxide, optionally in mixed or doped form.

9. The process as claimed in one of claims 1 to 8, characterized in that the coating with photocatalytic properties is deposited on the substrate within the actual plasma discharge.

10. The process as claimed in one of claims 1 to 8, characterized in that the coating with photocatalytic properties is deposited on the substrate outside the plasma discharge.

11. A substrate based on glass, ceramic, glass-ceramic or plastic, provided on at least part of at least one of its faces with a coating with photocatalytic properties, comprising at least partially crystallized titanium oxide, obtained by implementing the process as claimed in any one of the preceding claims, characterized in that the crystallized titanium oxide is in anatase form, in rutile form, in brookite form or in the form of a mixture of anatase, rutile and brookite.

12. The substrate as claimed in claim 11, characterized in that the crystallized titanium oxide is in the form of crystallites with a mean size of between 0.5 and 60 nm, preferably 1 to 50 nm.

13. The substrate as claimed in either of claims 11 and 12, characterized in that the coating also includes a mineral material, especially in the form of an amorphous or partially crystallized oxide or mixture of oxides, of the silicon oxide, titanium oxide, tin oxide, zirconium oxide, aluminum oxide, vanadium oxide, antimony oxide, zinc oxide, tungsten oxide, cobalt oxide or nickel oxide type.

14. The substrate as claimed in either of claims 11 and 12, characterized in that the coating includes additives capable of extending the photcatalytic effect due to titanium oxide, especially by increasing the absorption band of the coating and/or by increasing the number of charge carriers by doping the crystal lattice of the oxide or by surface doping of the coating and/or by increasing the efficiency and rate of the photocatalytic reactions, or by preventing the recombination of charge carriers in the material, by covering at least part of the coating with a catalyst.

15. The substrate as claimed in claim 14, characterized in that the crystal lattice of the titanium oxide is doped, especially by at least one of the metallic or nonmetallic elements.

16. The substrate as claimed in one of claims 11 to 15, characterized in that the thickness of the coating is between 5 nm and 1 micron, preferably 5 to 100 nm.

17. The substrate as claimed in one of claims 11 to 16, characterized in that the photocatalytic activity of the coating is at least 5×10^{-3} cm^{-1} min^{-1} measured by means of the TAS test.

18. The substrate as claimed in one of claims 11 to 17, characterized in that the rms roughness of the photocatalytic coating is between 2 and 20 nm, especially between 5 and 20 nm.

19. The substrate as claimed in one of claims 11 to 18, characterized in that the light reflection of the photocatalytic coating is less than 30%, preferably less than or equal to 20%, with a neutral color.

20. The substrate as claimed in one of claims 11 to 18, characterized in that the absorption of the photocatalytic coating is less than 10%, preferably less than 5 %.

21. The substrate as claimed in one of claims 11 to 19, characterized in that at least one thin film having an antistatic, thermal or optical function, or forming a barrier to the migration of alkali metals coming from the substrate, is placed beneath the coating with photocatalytic properties.

22. The substrate as claimed in claim 21, characterized in that the thin film having an antistatic function, possibly with controlled polarization, and/or having a thermal and/or optical function is based on a conductive material of the metal type or of the doped metal oxide type, such as ITO, $Sb:SnO_2$, $F:SnO_2$, In:ZnO, F:ZnO, Al:ZnO, or Sn:ZnO, or a metal oxide substoichiometric in oxygen, such as SnO_{2-x} or ZnO_{2-x}, where $x < 2$.

23. The substrate as claimed in claim 21, characterized in that the thin film having an optical function is based on an oxide or a mixture of oxides, the refractive index of which is intermediate between that of the coating and that of the substrate, especially that (or those) chosen from the following oxides: Al_2O_3, SnO_2, and In_2O_3, or based on silicon oxycarbide or silicon oxynitride, or mixed oxides based on a mixture of a material of high refractive index with a material of low refractive index.

24. The substrate as claimed in claim 21, characterized in that the thin film having an alkali-metal barrier function is based on a silicon oxide, nitride, oxynitride or oxycarbide, $F:Al_2O_3$, aluminum nitride, SnO_2 or silicon nitride.

25. The substrate as claimed in one of claims 11 to 24, characterized in that the substrate is a transparent, flat or curved, substrate.

26. The substrate as claimed in one of claims 11 to 24, characterized in that the substrate is a glass substrate.

27. The substrate as claimed in one of claims 11 to 24, characterized in that the substrate is a substrate based on a polymer, especially PMMA, polycarbonate or PEN.

28. An "antisoiling and/or antifogging", monolithic, multiple (double) or laminated glazing assembly incorporating a substrate as claimed in any one of claims 11 to 27, for the manufacture of glazing that is "self-cleaning", antifogging and/or antisoiling, as regards organic and/or mineral soiling, especially building windows of the double-glazing type, vehicle windows of the windshield, rear window or side-window type for automobiles, trains and aircraft, or utilitarian glazing, such as glass for an aquarium, for shop windows, for a greenhouse, for interior furnishing, for urban furniture, or mirrors, television screens, or glazing with electrically controlled variable absorption, or photovoltaic cells.